GREAT PLAINS
Center for Agricultural Health

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SECTION I

CENTER SUMMARY

The Great Plains Center for Agricultural Health at The University of Iowa is a nationally recognized resource with an established record of developing and implementing programs of research, intervention, translation, education, and outreach to prevent occupational injury and illness among agricultural workers and their families. The Center addresses the health and safety needs of agricultural workers in the Midwestern states of Iowa, Missouri, Kansas, Nebraska, Illinois, Wisconsin, Minnesota, South Dakota, and North Dakota. These states constitute America's most agriculturally intensive region.

The overall goals of the Great Plains Center for Agricultural Health are to:

1. Conduct multidisciplinary research targeting national priorities for agricultural health and safety.
2. Develop and evaluate educational, outreach, and intervention programs to prevent disease, injury, and hazardous exposures among agricultural workers.
3. Serve as a national resource for delivery of agricultural health knowledge and expertise to industrial hygienists, epidemiologists, ergonomists, veterinarians, and physicians to enhance the national capacity to meet the agricultural health and safety needs.
4. Provide agricultural health and safety technical assistance and consultation to health and safety professionals, community-based agricultural health organizations, and agricultural producers, themselves.
5. Maintain and strengthen linkages with health professionals in academic institutions, state and federal agencies, and international organizations to promote agricultural health and safety efforts.

RELEVANCE

Agricultural workers experience high rates of fatal and nonfatal occupational injury and illness when compared to other employed groups. As the region's most well-established agricultural health and safety resource, Great Plains Center activities are highly relevant to agricultural workers, health department officials, community organizations, public health scientists, physicians, and researchers committed to protecting the health and safety of all persons engaged in agricultural work. Relevance is described by project, below.

Prevention Intervention Core: Intervention to Reduce Aerosol Exposures in CAFOs (R Anthony)
The focus of this project is to improve the air quality of swine concentrated animal feeding operations (CAFOs) using standard mechanical ventilation design methods, typical of industries other than agriculture. An estimated 200,000 to 500,000 US workers in CAFOs are at substantial risk of adverse respiratory outcomes from poor air quality. This project presents a structured method to assess the relative effectiveness of ventilation and contaminant control devices to reduce these exposures and, ultimately, the development of these adverse outcomes. To have the largest impact on the protection of human health, the project focuses on the season/production cycle associated with the highest exposure (winter in the Midwest) in areas where workers have the highest exposure risks due to full-shift building occupation (farrowing barns). The three aims for this research are to, (1) identify optimal clean air delivery to the building through computer modeling; (2) select and bench test appropriate air pollution controls based on efficiency of contaminant removal and costs; and (3) field test the complete system in a CAFO farrowing facility during winter months.

Research Core: Farm Equipment Crash Study (M Ramirez)

Roadway crashes involving farm equipment are a persistent risk in the Midwestern U.S. Prevention efforts require an understanding of the patterns of these crashes and the development of effective interventions to reduce crash risks. The goals of this project are to (1) determine if farm equipment/vehicle crash rates vary across nine Midwest states and to examine whether rates are higher among states with the least strict marking and lighting policies, (2) identify individual, crash and environmental risk factors for farm equipment/vehicle crashes and subsequent injuries, (3) determine if operators of farm equipment/vehicles with citations for marking and lighting have increased risk for crashes and crash-related injuries, and (4) use Geographic Information Systems to identify high frequency locations for these crashes and characterize roadway factors that are associated with crashes.

Research Core: Musculoskeletal Symptoms among Agricultural Workers (N Fethke)

Musculoskeletal symptoms and disorders are common and frequently disabling conditions among agricultural workers. This prospective epidemiological study will (1) provide new information about associations between physical risk factors (e.g., forceful muscular exertions, awkward postures, repetitive activities, and whole-body vibration) and musculoskeletal symptoms among a large cohort of agricultural workers, and (2) characterize the fundamental biomechanical aspects of exposure to physical risk factors during common agricultural activities. Our approach uses a combination of repeated assessment using questionnaires among the full cohort and, among a subsample of participants, on-farm direct measurements of exposures to physical risk factors. The results of this research will contribute important knowledge for future intervention efforts to prevent these conditions.

Education/Translation Core: Advancing Research to Practice through Community Partners (F Gerr)

Although a considerable amount of research information is available about risk factors for agricultural injury and illness, rates of these outcomes among agricultural producers continue to be unacceptably high. The goal of this project is to reduce occupational injuries and illnesses among agricultural producers within the GPCAH nine-state region of the Midwest by facilitating research-to-practice activities (i.e., *translation*) in collaboration with the Center's community partners and others. Multiple avenues of outreach and dissemination are used to maximize the impact of research on prevention of injury and illness.

Education/Translation Core: Building Capacity Program (D Rohlman, F Gerr)

The goal of the Building Capacity Program is to offer quality, evidence-based education and training in order to prevent agricultural injury and illness. We offer a variety of training opportunities for a diverse audience, including agricultural producers, employers, graduate students, public health and safety professionals, health care providers, and research scientists. Regardless of background, the Center has a training opportunity to the needs of today's agriculture.

The Aims of this project are to:

Aim 1a: Establish a Curriculum Advisory Committee of national agricultural health experts to recommend updates to the curriculum of *Agricultural Medicine: The Core Course*.

Aim 1b: Develop additional agricultural health and safety curriculum tailored to regional variations in workforce demographics and culture and to regional agricultural health and safety risks.

Aim 2: Create instructional materials for trainers and trainees to support the delivery of the AMCC by qualified instructors other than those at the University of Iowa.

Aim 3a: Offer *Agricultural Medicine: The Core Course* to health care and occupational health and safety professionals in the Upper Midwest on an annual basis.

Aim 3b: Offer *Agricultural Medicine: The Core Course* with regionally appropriate content to health care and occupational health and safety professionals in Texas, Alabama, and other locations

Aim 4: Create an "academy" of agricultural medicine instructors who receive in-depth training, mentoring, and certification to establish a sustainable pool of trainers across the country.

Evaluation (E Parker)

Evaluation Program. Effective and appropriate evaluation serves as an important guide to all public health activities. Evaluation provides an indication of the effectiveness of activities and resource allocation. The inclusion of surveillance activities augments evaluation by providing estimates of the actual morbidity and mortality experience of agricultural workers. The ultimate goal of the center is to prevent agricultural injury and illness. Surveillance of these outcomes provides the most direct assessment of the impact of Center activities.

Surveillance Program. *(C Peek-Asa)* The surveillance activities of the University of Iowa Great Plains Center for Agricultural Health are a component of the Evaluation Program. The aims of the Surveillance Program are to (1) provide local and state agencies with information about trends and characteristics in agricultural traumatic fatalities and injuries and (2) provide an infrastructure to assist GPCAH collaborators to integrate surveillance data in their research.

Pilot Feasibility/Emerging Issues Program (F Gerr)

The Pilot/Feasibility Projects and Emerging Issues (P/F&EI) Program is an incubator for new research, prevention, intervention, outreach, education, evaluation, and translation activities. In order to assure separate and "level playing fields" for community-based applications, we aimed to fund two $15,000 proposals in each area. Ten proposals were submitted in the first round of applications in Spring 2012. We funded three proposals, two academic and one community-based. An off-cycle round in September resulted in another ten proposals, with funding awarded to one academic proposal.

KEY PERSONNEL

Name	eRA Commons User Name	Organization	Role on Project
Gerr, Fredric	fredgerr	University of Iowa	Center Director
Anthony, Renee	ranthony	University of Iowa	Project Leader
Fethke, Nathan	fethke	University of Iowa	Project Leader
Rohlman, Diane	rohlmand	University of Iowa	Project Leader
Parker, Edith	edithp	University of Iowa	Project Leader
Peek-Asa, Corinne	cpeekasa	University of Iowa	Co-investigator
Ramirez, Marizen	maremirez	University of Iowa	Project Leader

CENTER WEB LINK

http://CPH.uiowa.edu/GPCAH/

SECTION II

PROGRAM HIGHLIGHTS OF HIGH IMPACT

Prevention Intervention Core: Intervention to Reduce Aerosol Exposures in CAFOs (R Anthony)

High impact accomplishments for Year 2 include (1) completion of feasibility assessment of the cost and effectiveness of using ventilation with recirculating air, (2) completion of bench testing of a filtration system to determine suitability and performance prior to deployment in a swine farrowing barn, and (3) installation of a ventilation system with air pollution control device at our project test site, with air quality and performance monitoring currently underway (Dec. 13 – Feb. 28).

At the beginning of this year, we completed modeling to optimize and evaluate the effectiveness and cost of engineering controls to improve air quality. Park *et al.* (2013) present this model, along with comparison to the field data of Reeve *et al.* (2013). While estimates of ammonia and carbon monoxide concentration were *lower* in the model compared to field measurements, estimates of dust and carbon dioxide were reasonably well represented in the model. Following the model development, we used the model to identify and rank relative performance of ventilation system designs (flow rates from 500 to 2000 cfm, five air pollution control devices to clean the ventilated air, and five recirculation fractions of treated air). Simulations, reported in Anthony *et al.* (in press) have identified that in-*room ventilated propane heaters may be a significant carbon dioxide source*, regardless of ventilation system selected. Additional modeling findings identified that, for the farrowing room we simulated, ventilation systems operating at 2000 cfm and recirculating 75 to 100% of air treated by traditional dust control technologies (cyclone, electrostatic precipitator, or filtration system) can reduce dust concentrations below recommended levels at costs of $0.22 to 0.54 per piglet produced, over a 90-day winter period. These results demonstrates an economic feasibility to improving air quality in Midwestern CAFO during the winter using standard industrial air pollution control technologies.

In addition to modeling, a filtration unit (shaker dust control system) was evaluated in the laboratory to examine the suitability of deploying an off-the-shelf air pollution control device in an agricultural setting. The unit was tested using standard polyester bag filters, operating at a flow rate of 1000 cfm. The test aerosol used to load the filter unit was Arizona Road Dust (<1 to 200 μm). The collection efficiency was assessed by particle size and ranged from 75% for small particles (<4 μm) to 99% for larger particles, by count. This filtration unit and control panel were then transported to and installed at the intervention test site in Fall 2013. Winter air quality testing has begun (December 13, 2013) and will continue through February 2014 to examine the effect of the new ventilation system on dust and gas concentrations within the farrowing barn. Initial results are anticipated to be available for presentation to agricultural safety and health professionals as the 2014 ISASH meeting.

Research Core: Farm Equipment Crash Study (M Ramirez)

Department of Transportation Data involving public roadway crashes with farm equipment from 2005-2010 were collected from nine Midwest states (IA, IL, KS, MN, NE, ND, SD, MO, WI) as part of this study. Geographical Information Systems was used to determine the zip code where the crash occurred and to link it to available census-based data. For example, Rural Urban Commuting Areas (RUCAs) were linked to each crash location by zip code to classify crash locations as urban, large rural, small rural or isolated rural. In addition, policies on lighting and marking have been collected from all nine states, and an analysis of the content of these policies have been conducted to assess how state policies align with recommendations provided by the American Society of Agricultural and Biological Engineers Standards (ASABE). A compliance score was calculated to measure extent to which state codes follow ASABE standards.

In the next year, a survey will be conducted with 9000 farm operators from the same nine states, in collaboration with the US Department of Agriculture's National Agricultural Statistical Service. The survey instrument has been drafted and submitted to USDA NASS for initial review.

The research team has also begun to develop manuscripts. Below are preliminary results:

1. *Crashes by rurality and proximity to town* (Dr. Karisa Harland, Mitch Greenan and Dr. Marizen Ramirez). Submitted to Accident Analysis and Prevention, invited for resubmission. Revision in progress. Results here are focused on the eight states with data from 2005 through 2010. Over six years, 4636 crashes in an eight state region involved farm equipment. Approximately, 70% of crashes occurred in rural and 29% in urban areas. Of the crashes occurring in rural zip codes, 32% happened in isolated rural communities, 20% in small and 19% in large rural towns. Farm equipment being rear-ended accounted for 23.5% of all crashes. Crashes within urban zip codes were more likely to occur close to a town/city than crashes in rural zip codes. Compared with rural crashes, urban crashes were also 66% more likely to involve more than one vehicle (aOR=1.66, 95% CL=1.20, 2.30), and 1.7 times more likely to be a non-collision than a rear-end (aOR=1.71, 95% CI = 1.26, 2.32).

***2. Utilizing GIS to examine roadway features associated with farm vehicle traffic crashes in the state of Iowa. (*MS Thesis by Agricultural and Safety Student, Mitch Greenan (advisor, Dr. Ramirez))** Iowa provided road segment data to the research team to specifically examine road segments as the unit of analysis. A case-control analysis was conducted utilizing Iowa data 2005-2011. GIS was used to examine Iowa road network data at the road segment aggregate level, and crash data points were geocoded along segments. Out of 319,705 Iowa road segments, 1,337 segments had a crash. Segments with higher traffic density had more crashes than segments with lower density. Speed limit was also associated with crashes.

3. Do states with stricter lighting and marking policies have reduced crash rates? (Dr. Marizen Ramirez, Ron Bedford (student), Hongqian Wu (student), Dr. Corinne Peek-Asa) All states had policies related to lighting and marking of farm equipment, however, compliance of these policies to ASABE standards was variable (mean =20.7, range=5-30). Illinois had the highest compliance score of 30 while Missouri had the lowest score of 5. In seven states except MO and IL, compliance with ASABE standards was associated with a significant reduction in farm equipment crash rates (β=-0.32.69, 95%CI=-0.57.29, -8.10).

Research findings have been presented at the 2012 and 2013 Midwest Rural Agricultural Safety and Health Conference and the 2013 International Society for Agricultural Safety and Health. In addition, results have been presented to collaborators from the Iowa Departments of Transportation and Public Safety and the 2013 Traffic Records Forum. At the Traffic Records Forum, seven of our nine state Departments of Transportation attended a special meeting with our research team to discuss the progress of our study.

Research Core: Musculoskeletal Symptoms among Agricultural Workers (N Fethke)

We have completed four rounds of musculoskeletal health survey administration, which includes the baseline survey and three rounds of follow-up. Participant retention rates at each round of follow-up have been good and we expect sufficient participation to accomplish the proposed aims upon completion of the study. Participants whose agricultural revenue was generated primarily through production of two commodities (e.g., beef cattle and grain) comprised 37.8% of the cohort (n=196). Other primary revenue-generating commodities included grain products only (n=182; 35.3%), beef cattle (n=19; 3.7%), specialty items such as fowl,

goats, horses, or fruits/vegetables (n=17; 3.3%), and dairy operations (n=12; 2.3%).No participants reported hogs as the primary source of agricultural revenue, although 19 participants produce hogs in combination with at least one additional commodity.

Estimates of musculoskeletal symptom prevalence are high, ranging from 23% to 48% depending on anatomical area (low back, neck/shoulder, or elbow/wrist/hand) and season. We have completed multivariable analyses to estimate associations between the two-week prevalence of musculoskeletal pain at baseline and the average number of weekly hours engaged in a variety of agricultural activities during the three month period prior to enrollment. Statistically significant associations were observed between low back pain and the average number of weekly hours engaged in agricultural equipment repair or maintenance (odds ratio [OR] = 1.02, 95% confidence interval [CI] = 1.00-1.05); between neck/shoulder pain and the average number of weekly hours engaged in moving animals (OR=1.14; 95% CI=1.00-1.30), milking animals (OR=1.05; 95% CI=1.00-1.09), and paperwork or other business-related activities (OR=1.02; 95% CI=1.00-1.08); and between elbow/wrist/hand pain and the average number of weekly hours engaged in manual material handling (OR=1.01; 95% CI=1.03-1.18) and milking animals (OR=1.04; 95% CI=1.00-1.09). Note that the odds ratios presented above are per each one hour increase in the reported average weekly hours engaged in the associated agricultural activities. A manuscript describing the cohort and the results of the multivariable analyses is in preparation. We also made 33 visits to participants' farms to conduct measurements of muscle activity, posture, and whole-body vibration. Reduction of the directly-measured exposure information to applicable summary measures is underway, although preliminary results are not yet available.

Education/Translation Core: Advancing Research to Practice through Community Partners (F Gerr)
The Center continues to draw on the resources of a diverse and talented advisory committee. In addition to agricultural safety and health specialists from the nine state Great Plains Center region, we have also appointed a representative from the NIOSH-funded Central States Center for Agricultural Safety and Health (CS-CASH, Omaha, NE) and Upper Midwest Center for Agricultural Safety and Health (UMASH, Minneapolis, MN) to our advisory committee. We hope to facilitate across center communication and collaboration in this way.

The Great Plains Center co-sponsors the largest annual agricultural safety and health conference specifically targeting agricultural health issues in the upper US Midwest (The Midwest Regional Agricultural Safety and Health Conference, MRASH). The MRASH conference during the reporting period was held in, Cedar Rapids, Iowa, in November, 2012. Approximately 100 attendees participated in this two day event. A special session on grain safety and grain rescue was conducted and hands-on grain rescue and grain safety training activities were conducted. Members of the national press were in attendance and have subsequently brought the issue of grain safety to the attention of a national audience.

In the current digital era, effective communication of agricultural safety and health information requires a high quality, attractive, and user-friendly presence on the internet. Over the past several years, the staff and faculty of the Great Plains Center has expended considerable effort upgrading the content and appeal of its web site (http://www.public-health.uiowa.edu/gpcah/) Highly accessible information is available, with a special emphasis on regional and seasonally-appropriate health and safety information. Of note are new sections providing practical and evidence-based guidance on important agricultural safety and health topics, including hearing loss prevention (http://cph.uiowa.edu/gpcah/resources/hearing-loss.html), heat illness prevention http://cph.uiowa.edu/gpcah/resources/heat-illness.html), tractor safety (http://cph.uiowa.edu/gpcah/resources/tractor-overturns.html), agriculture and the older farmer

(http://cph.uiowa.edu/gpcah/resources/older-farmers-ranchers.html), and grain engulfment and grain safety (http://cph.uiowa.edu/gpcah/resources/grain-engulfment-entrapment.html).
We are also increasing our presence in settings accessible to those who are not users of the internet. Specifically, we have emphasized direct and personal contact with agricultural producers at farm shows and county fairs. In order to maximize awareness of health and safety issues at these events, we have created education level-appropriate and easy to use full-color brochures presenting important information about health and safety hazards for distribution to producers attending these events. In addition, to bring awareness to agricultural populations about the Center and to increase use of hearing protection, we are distributing inexpensive but effective foam ear plugs in small cases embossed with the center name and web site.

The Center also publishes a quarterly newsletter in which we disseminate practical, evidence-based information needed for prevention of agricultural injury and illness. The Alive and Well newsletter has a large distribution across the upper Midwest. The most recent newsletter and an archive of past newsletters is available at http://www.public-health.uiowa.edu/gpcah/farm-families/index.html

Efforts to disseminate credible and trusted health and safety information are challenged by limited information about frequency of use and level of trust of various "channels" available for dissemination health and safety information. In order to address this limitation, we have surveyed nearly 200 agricultural producers to learn about their preferred communication channels. Efforts are now underway to identify frequently used and highly trusted channels and to identify factors, such as age, gender, type of farm and others, that influence these preferences. The results of this study will allow for better targeting of health and safety information to selected farm and operator characteristics.

Education/Translation Core: Building Capacity Program (D Rohlman, F Gerr)
The delivery of the Agricultural Medicine Core Course continues to be extremely popular among trainees and practitioners of agricultural health. The annual delivery of the course at the University of Iowa continues to be very well attended.

We have been active in our efforts to update the course and the supporting curriculum. A panel of experts has contributed valuable content to the process. The revised course will have greater emphasis on identification and mitigation of safety hazards and added emphasis on prevention of agricultural illness.

In addition to the delivery of the Core Course at the University of Iowa, the Building Capacity faculty facilitate its delivery nationally. Specifically, the Core Course has been delivered with our assistance in Vermont, Nebraska, and North Carolina and will soon be delivered in Texas. Since the beginning of the current funding cycle, it has been delivered ten times to a total of 225 trainees. We are also now planning delivery of the core course in Alabama. We know of no other agricultural health and safety educational program that has enjoyed such widespread dissemination and such enthusiastic reception. Delivery of the course in each location includes the development of regionally-specific agricultural health and safety content.

Evaluation Program (E Parker)
Evaluation Program. Marsha Cheyney, MPH, was hired to fill the Evaluation Coordinator position in February 2013. Ms. Cheyney attended the meeting of Center Evaluators with NIOSH representatives to improve evaluators' understanding of NIOSH reporting needs and to encourage collaboration between Centers on evaluation and outreach efforts. This collaboration is ongoing via several working groups.

The data collection instruments and evaluation process used by centers were reviewed and revised to more efficiently collect the data needed to perform the Center evaluation and reduce reporting duplication by Center investigators. The Year 2 evaluation activities were conducted using the new processes and instruments. A database to track evaluation activities was developed and populated.

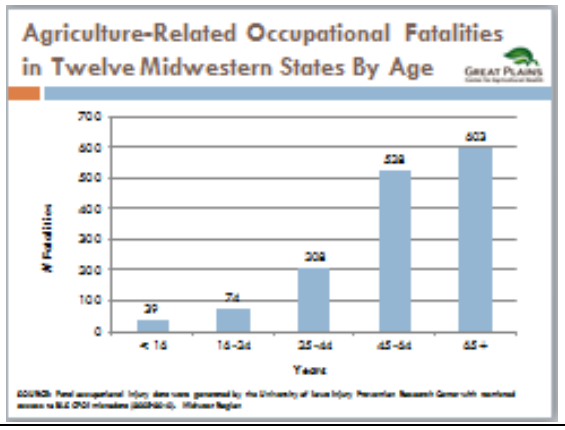
The evaluation team developed and implemented a Center Leadership and Administration evaluation to examine the strengths and weaknesses of Center administration and activities. Information was compiled from three data sources: the year two internal advisory committee focus group, the Regional Advisory Committee annual survey, and a survey of all Center faculty, staff, and students.

The evaluation team continues working with the outreach team to assist them with the development of evaluation indicators and methods to document whether and how the Center's outreach goals are met. Two efforts were made this year toward that goal:

- The Regional Advisors annual survey was developed to help Center administration understand what types of outreach materials are most needed by organizations that work directly with producers and agricultural workers in the Upper Midwest, and to invite input from Regional Advisors regarding additional ways the Great Plains Center can reach out to its stakeholders.

- The Farm Communication Study was conducted to determine the sources of agricultural health and safety information most frequently used and most trusted by producers. Nearly 200 farmers and farm workers completed a short survey about the information sources they use and trust at county fairs in east-central Iowa, and several small focus groups were held at the Farm Progress Show to gather more in-depth information based on survey responses.

Surveillance Program. *(C Peek-Asa)* The Surveillance Core team established an agreement with the OSHA/Bureau of Labor Statistics Census of Fatal Occupational Injuries (CFOI) to analyze agricultural fatalities for the eleven state GPCAH Midwestern region. From these data, we produced a report that summarizes trends and characteristics of agricultural injuries, as well as a PowerPoint Presentation that Center stakeholders can download and use for their own presentations. The slideshow can be downloaded with our without text (in the form of comments) about the content of each slide. The report and PowerPoint slide show have been reviewed and approved for distribution by the Bureau of Labor Statistics, and we are currently making these available through the website. A sample slide is provided below.



Risk factors for agricultural fatalities comparing animal and crop production
Using the CFOI data, we have just begun an analysis to compare fatalities and their characteristics comparing animal and crop production. Initial analyses indicate that (i) these fatalities have different age trends, with animal production associated with younger fatalities; (ii) the seasonal variation differs by type of production; and (iii) causes of fatality and injury patterns are different. We plan to have a presentation and prepared manuscript in the current funding year.

We have prepared and submitted for review a manuscript that examines work and non-work farm-related injuries. The abstract from this publication is provided below.

Abstract

Background: Farm-related injuries are an important public health problem in agriculture because of their impact on individuals, families, and farm operations. While surveillance programs such as the Census of Fatal Occupational Injuries (CFOI) is available to track fatal agricultural injuries, more work is needed to examine the burden of non-fatal agricultural injuries.

Methods : Data involving agricultural injuries were collected from the Iowa Trauma Registry from January 1, 2005 through December 31, 2011. A total of 2,490 trauma patients were found to have been classified as having a farm-related injury. These non-fatal farm-related injuries were compared by work-relatedness, injury severity score, length of hospital stay, and hospital discharge status. Also reported are the age and gender of the trauma patients, as well as the population of the county in which the injury occurred.

Results: In our analysis, we found that work vs. non-work relatedness had little effect on injury severity, but that work-related injuries did result in longer average hospital stays. Injuries occurring in counties of lower population size tended to be slightly more severe and be more likely to have non-routine discharges.

Conclusions: Farm environments pose hazards which are persistent for those working and living on the farm, regardless of whether or not they are engaged in work-related activities. Public health prevention approaches that consider work and non-work farm environments may be helpful in designing interventions to reduce injury.

Delayed access to trauma care for agricultural injuries
After a traumatic injury, timely access to trauma care is a critical factor in survival and recovery – often termed the "golden hour." Using the Iowa State Trauma Registry, we are examining time to definitive care, comparing agricultural injuries, work-related injuries in other industries, and work-related injuries to rural workers. We are examining discovery time (time to discover that an injury has occurred), response time (time that it takes for EMS to arrive at the scene), scene time (time it takes for emergency responders to extricate, stabilize, and leave the scene with the injured person, and time to definitive care (time to reach the final treating hospital). From this analysis, we hope to identify if it takes longer for agricultural injuries to reach definitive care, and if so, where these differences are found.

Pilot Feasibility/Emerging Issues Program (F Gerr)

FUNDED PILOT PROJECTS

Investigators	Organization	Proposal
2013-2014		
Jennissen, C	University of Iowa	*Piloting an occupational ATV/UTV safety workshop for Iowa farmers*
Aherin, B	University of Illinois	*Promoting harness and lifeline use in grain bin entry for farm and elevator workers through development, training, and distribution of specific lifeline installation /procedures/use training curriculum*
Khan, K	University of Iowa	*Evaluation of technology-based interventions to increase the use of hearing protection among adolescent farmworkers in Iowa*
Schneberger, D	Univ Nebraska MC	*Effect elevated carbon dioxide on lung inflammation in barn Dust-instilled mice*
2012-2013		
Adkisson, J	IL Grain & Feed Assn.	*Using technology to enhance the flexibility, adaptability of training tools for community based training in grain handling safety*
Jennissen, C	University of Iowa	*Determining the mechanisms and outcomes of ATV crashes among high-risk groups in the Great Plains Region*
LeVan, T	Univ Nebraska MC	*Genetic variation in endotoxin receptors and their association with COPD phenotypes*
Koc, AB	University Missouri	*A tractor rollover detection and emergency system based on mobile electronic devises*
2011-2012		
Burgess, S	Farm Safety Just for Kids	*Web-based interaction encouraging safe and healthy rural-related behavior*
Adkisson, J	IL Grain & Feed Assn.	*Using community based partnerships for grain safety awareness and prevention training across the grain handling Spectrum*
Neenan, D	National Education Center for Ag. Safety	*Prevention of injury, illness, and fatality due to grain entrapment and exposure*

See Appendix A for pilot project abstracts.

APPENDIX A

Pilot Projects Funded for 2013-14

Project Title: **Piloting an occupational ATV/UTV safety workshop for Iowa farmers**
PI: Charles Jennissen, MD, University of Iowa, Department of Emergency Medicine
Co-Investigators: Kari Harland, PhD, University of Iowa, Iowa Injury Prevention Research Center; Gerene Denning, PhD, University of Iowa, Iowa Injury Prevention Research Center; Andy Winborn, BS, Rural Health and Safety Clinic of Greater Johnson County

Summary of Project:
Although safety education is known to be an essential part of injury prevention, opportunities for occupational ATV safety training among farmers are highly limited. The objectives of our outreach program are (1) to pilot a workshop that provides relevant, evidence-based training to farmers related to safe occupational use of ATVs and UTVs (side by sides), (2) to assess the effects of the workshop on short- and long-term (6 months) knowledge, on the reported likelihood of using the knowledge gained, and on safety behaviors at follow up; and (3) to collect detailed data on the participant's experiences with occupational loss of ATV/UTV control events. These experiences will serve multiple purposes including their use as narratives in ATV safety training programs. Results from these studies will facilitate future dissemination of validated agriculture-related ATV safety training that in turn will contribute toward our long-term goal of reducing agricultural ATV- and UTV-related deaths and injuries.

Project Title: **Promoting harness and lifeline use in grain bin entry for farm and elevator workers through development, training, and distribution of specific lifeline Installation/procedures/use training curriculum**
PI: Bob Aherin, PhD, Grain Handling Safety Coalition, University of Illinois
Co-Investigators: Davis Hill, BS, EMT-P, Emergency Services Rescue Training, Inc.

Summary of Project:
Two agencies are partnering to share resources, knowledge and expertise in the development, distribution and instructor training of a Lifeline Installation/Procedures/Use Training Curriculum for farm and elevator workers. Emergency Services Rescue Training, Inc. (ESRT, Inc.), a non-profit 501c3 was founded in 2002 by Davis Hill, Program Director at Pennsylvania State University's Managing Agricultural Emergencies. ESRT, Inc.'s mission is to develop training curriculum and a national network of training instructors to effectively handle farm and industrial emergencies. The Grain Handling Safety Coalition (GHSC) was formed in September 2010 to address the issues of safety throughout the grain handling industry at the community level. This broad based coalition represents associations, agencies, and individuals with an interest in promoting accident prevention through increased hazard awareness, safety education, prevention, and outreach.
The proposed curriculum focuses solely on how to use the recommended safety harness and lifeline for bin entry to complete regular work tasks. There is no such curriculum currently available to train workers on this preventive safe practice. Already by August 2013, there were 20 known entrapment/ engulfment cases throughout the United States. In 2010, 57 known cases resulted in 31 deaths. Though the numbers seem small, these incidences are preventable by using the recommended safe practices. When an incident occurs it often takes several rescue units and a great deal of resources to try to effectuate a successful rescue. Teaching end-users to prevent the situation from occurring preserves both financial resources and the lives of victims and rescuers. The grant monies being sought will help support the development, pilot train the trainer session, and distribution of this specially designed curriculum

Project Title:	**Evaluation of technology-based interventions to increase the use of hearing protection among adolescent farmworkers in Iowa**
PI:	Khalid Khan, DrPH, University of Iowa, Department of Occupational and Environmental Health
Co-Investigators:	Diane Rohlman, PhD, University of Iowa, Department of Occupational and Environmental Health; Andy Winborn, BS, Rural Health and Safety Clinic of Greater Johnson County; Salome Tonelli, MSN, Rural Health and Safety Clinic of Greater Johnson County

Summary of Project:
Agricultural workers in all age groups including adolescents are often exposed to high levels of noise from various types of farm operations. Chronic noise exposure is associated with loss of hearing, even at a young age. To reduce noise exposure, one low-cost preventive measure is the use of hearing protection devices (HPD). Traditional classroom-based training for adolescent farmers has achieved some degree of success to increase the use of HPD. However, this success is still marginal indicating more improvement is needed. We hypothesize that technology-based approaches such as noise-measuring mobile apps (noise apps) and computer-based training can improve the efficacy of interventions. These technology-based approaches are relatively inexpensive, easily accessible and have the ability to educate greater numbers of young farmers using minimal logistic support. We propose to conduct the study on high school students who are the members of The National FFA Organization (formerly Future Farmers of America) and also work on a farm. Through a collaborative effort between the researchers from the Department of Occupational and Environmental Health of the University of Iowa and Greater Johnson County Rural Health and Safety Clinic (RHSC), adolescent farmers will be recruited in three intervention groups (classroom training, classroom training plus noise apps and computer-based training) to accomplish two specific aims. By examining changes in knowledge, attitude and behavior first we will examine if the addition of noise apps to traditional classroom-based training could improve the efficacy of the intervention. Then we will compare the efficacy of computer-based training vs. classroom-based training.

Project Title:	**Effect of elevated carbon dioxide on lung inflammation in barn dust instilled mice**
PI:	David Schneberger, PhD, University of Nebraska Medical Center

Summary of Project:
Exposure to animal confinement barn dust is known to cause lung inflammation that leads to a number of respiratory problems in barn workers. The barn environment however contains a number of other potential factors that can influence response to these dusts. We propose to examine the effects of elevated levels of carbon dioxide also present in barns to determine its contribution to dust-induced lung inflammation. Using a mouse model system, we will examine the effects on lung inflammation of elevating carbon dioxide (CO_2) to levels present in these barns after exposure to nasally instilled barn dust extract. We hypothesize that elevated CO_2 will reduce indicators of inflammation in mice. This work will help to better inform dust elimination and ventilation strategies in confinement barns.

Pilot Projects Funded for 2012-13

Project Title:	**Using technology to enhance the flexibility, adaptability of training tools for community based training in grain handling safety**
PI:	J Adkisson, BS, Grain and Feed Association of Illinois
Co-Investigators:	R Aherin, PhD, University of Illinois; P Rhomba, MS, Illinois Farm Bureau

Summary of Project:

Under a prior GPCAH Community Partners Small Grant Program, the Grain Handling Safety Coalition developed a curriculum module Overview of Safe Handling and Storage of Grain, including a Train the Trainer component. We will continue to offer both Tier 1 and Tier 2 training of the Overview Curriculum to both the production and commercial sectors. We will be enhancing the current evaluation mechanism of this module to include a pre- and post-learning assessment. The post learning evaluation instrument will also include questions targeting participants' likes/dislikes of the presentation format. An advanced analysis will be performed to determine areas of technical effectiveness; identify areas in which technical content requires improvement; and identify areas of unfavorable presentation format. The results of this analysis will drive enhancements and improvements to the curriculum utilizing electronic media applications. The goal is to produce a curriculum which can be more interactive, flexible, and adaptable according to audience/instructor needs. A Level Two evaluation instrument will be utilized to assess the effectiveness of the improvements and enhancements, as well as content, for learning acquisition and reaction. Lastly, we will explore the feasibility and cost of other electronic media applications, such as phone apps or virtual training.

Project title:	**Determining the mechanisms and outcomes of ATV crashes among high-risk groups in the Great Plains Region**
PI:	C Jennissen, MD, University of Iowa, Department of Emergency Medicine
Co-investigators:	G Denning, PhD, K Harland, PhD, University of Iowa, Department of Emergency Medicine

Summary of Project

All-terrain vehicle (ATV) crashes are a serious public health and safety concern in and near rural communities. To date, studies of ATV-related deaths and injuries have focused on the larger ATV user population which rides ATVs primarily for recreational purposes. In contrast, little or nothing is known about ATV crashes and injuries among agricultural families, particularly those resulting from occupational use. In addition, there is no published data regarding injuries and deaths due to crashes with utility vehicles (UTV) or side-by sides, a type of off-highway vehicle that has gained more recent popularity. The objective of our pilot study is to determine the epidemiology and mechanisms of injury for occupational ATV crashes, and especially those that involve UTVs. For these studies, we will use several data sources, including records from the Iowa Department of Transportation (IDOT) and state trauma registry (2002-2009) and press clippings for the 9-state Great Plains region (2009-2011). We will also analyze data from the Keokuk County Rural Health study, the only population-based study of rural families. Finally, in collaboration with Dr. Marizen Ramirez, we will include occupational ATV and UTV crashes as part of a larger study on farm vehicle crashes, using DOT data from several states. Our studies will provide important insights into the factors that contribute to occupational ATV and UTV injuries and will be valuable for developing targeted ATV/UTV injury prevention programs for farm families.

Project Title:	**Genetic variation in endotoxin receptors and their association with COPD phenotypes**
PI:	Tricia LeVan, PhD, University of Nebraska Medical Center
Co-Investigators:	James Merchant, MD, PhD, University of Iowa; Kevin Kelly, PhD, University of Iowa, Department of Occupational and Environmental Health

Summary of Project

Chronic obstructive pulmonary disease (COPD) is a complex disease of major public health concern, and is the 3rd leading cause of mortality worldwide. The American Thoracic Society concluded that the fraction of COPD due to occupational exposures was as much as 15%, independent of smoking. Farming is among occupations associated with COPD with a COPD prevalence of COPD of 30% in smokers and as much as 17%

in never smokers. Human genetic studies provide support for genetic factors involved in occupationally-related COPD manifestations. Yet there is a fundamental gap in our understanding how agricultural exposures contribute to COPD. We hypothesize that unique genes may contribute to COPD in agricultural workers. A major strength of our application is the use of the Keokuk prospective cohort and the existing collaboration between the University of Nebraska and the University of Iowa. Goals of this study are: 1) to perform a case/control candidate gene association study in Keokuk subjects with and without COPD, chronic bronchitis, FEV1 and FEV1/FVC as the primary outcome phenotypes; 2) to use a single SNP, gene-centric and pathway approach for association analyses; and 3) to perform gene-environment interaction analyses using genes associated with COPD phenotypes. We expect to identify novel genes and consequent pathological mechanisms of COPD in agricultural workers.

Project Title: **A tractor rollover detection and emergency reporting system**
PI: AB Koc, PhD, University of Missouri
Co-Investigator: W Downs, PhD, University of Missouri

Summary of Project
The overall goal of this proposal is to develop a multifunctional vehicle stability monitoring and emergency reporting system for motorized vehicles using the data from the inbuilt sensors of mobile electronic devices (tablet computers and smart phones). An iPhone application, vehicle rollover/accident prevention, education, training and emergency reporting system has already been developed by the PI's group. We perceive that it will be suitable for several motorized vehicles. With this project we aim to conduct tractor rollover tests to evaluate the accuracy and the limitations of the system.
The specific aims of the proposal are:

1) To modify a 2WD agricultural tractor for laboratory and field experiments;
2) To conduct field upset tests to evaluate the reliability and accuracy of the functions of the system;
3) To demonstrate the use of the system for educating the public on tractor rollover

Pilot Projects Funded for 2011-12

Project Title: **Web-based interaction encouraging safe and healthy rural-related behavior**
PI: S Burgus, Med, Farm Safety 4 Just Kids
Co-Investigator: K Funkenbusch, PhD, University of Missouri

Summary of Project:
The number of farms has remained relatively unchanged during the past two decades, an increase of small part-time and large farm operations continues while traditional mid-sized family farms become fewer. Only 45% of principal operators listed farming as their primary occupation in 2007.

This project will identify effective ways to electronically communicate safety and health messages to farm family members, especially among non-traditional farm families. Surveys will identify preferred electronic communications systems and modes used to convey safety and health topics to the intended audience. Web-based social networking will encourage farm families to interact about ways to prevent injuries due to the rural agricultural working environment.

Project Title: **Using community based partnerships for grain safety awareness and prevention training across the grain handling spectrum**
PI: J Adkisson, BS, Grain and Feed Association of Illinois

Co-Investigators: R Aherin, PhD, University of Illinois; P Rhomba, MS, Illinois Farm Bureau

Summary of Project:
The Grain Handling Safety Coalition (GSHC) will focus on a combined program of increased awareness and prevention education for the commercial and production grain industries. The program's specific aims include:

1) Raise awareness of the dangers, hazards and risks across the grain handling spectrum through the dissemination of information and public services announcement by utilizing the established network of the GHSC;
2) Develop a network of community based education programs to teach preventive safety measures by facilitating the collaboration of commercial, production, rescue, manufacturing, education, inspection, regulation, and health care personnel and;
3) Deliver a consistent message of safety and prevention as a first priority through the development of curriculum and materials, including train-the-trainer curriculum, in a variety of formats and made readily accessible through the GHSC network.

Project Title: **Prevention of injury, illness, and fatality due to grain entrapment and exposure**
PI: D Neenan, EMT, PS, National Education Center for Agricultural Safety

Summary of Project:
The National Education Center for Agricultural Safety (NECAS) will develop and implement an interactive educational program for farmers and ranchers and their families in the Great Plains Center for Agricultural Health region. Proposed sites are in rural South Dakota, Iowa, Missouri, and Minnesota. The primary focus will be on grain safety and entrapment issues. Machinery safety, personal protective equipment, and chronic health issues will be a part of the presented program. Optional educational opportunities will include first aid and CPR classes. The equipment to be used will include the portable grain bin simulator, general farm equipment, and personal protective equipment. Collaborating partners will include local agribusinesses, Cooperative Extension, area educators and volunteer emergency service and fire fighters. In addition to community education, a five hour rescue training program will be available for area rescue personnel. Grant funding will be used to support staff time, travel, equipment support and training materials.

APPENDIX B

GPCAH Outputs
October 2011 through September 2013

Agricultural Safety and Health Manuscripts Accepted for Publication

Donham KJ, Kline AK, Kelly KM, Lange JL, Rautiainen RH. (2013) Respirator and Hearing Protection Use in the Certified Safe Farm. J Agromedicine. 2013; 18(1):18-26.

KJ. Dunham. "Challenges to Occupational and Community Health and the Environment in Animal Production and Housing" in *Livestock housing: Modern management to ensure optimal health and welfare of farm animals*, A. Aland and T. Banhazi, Eds. Netherlands: Wageningen Academic Publishers, 2013, pp. 455-483.

Douphrate DI, Fethke NB, Nonnenmann MW, Rosecrance JC, Reynolds SJ: (2012) Full shift arm inclinometry among dairy parlor workers: a feasibility study in a challenging work environment. Applied Ergonomics, 43(3):604-613. (PMID: 22019358)

Hoppin JA, Long S, Umbach DM, Lubin JH, Starks S, Gerr F et al: (2012) Lifetime organophosphorous insecticide use among private pesticide applicators in the Agricultural Health Study. J Expo Sci Environ Epidemiol,
22(6): 584-92.

Humann M, Gerr F, Sanderson WT, Kelley K, Merchant JA: (2012) Effects of common agricultural tasks on measures of hearing loss. Am J Ind Med, 55(10): 904-16.

Leedom Larson KR, Wagstrom EA, Donham K, Harper A, Hanson BM, Male M, Smith TC: (2012) MRSA in pork production shower facilities: an intervention to reduce occupational exposure. J Agric Saf Health, 18(1): 5-9.

Onwuameze OE, Paradiso S, Peek-Asa C, Donham KJ, Rautiainen RH. (2013) Modified Risk Factors for Depressed Mood Among Farmers. Ann Clin Psychiatry. 2013 May; 25(2):83-90.

O'Shaughnessy PT, Peters T, Donham K, Taylor C, Altmaier R, Kelly K: (2012) Assessment of swine worker exposures to dust and endotoxin during hog load-out and power washing. Ann Occup Hyg, 56(7): 843-51.

Park JH, Peters TM, Altmaier R, Sawvel RA, Anthony TR. (2013) Simulation of air quality and cost to ventilate swine farrowing facilities in winter. *Journal of Computers and Electronics in Agriculture* 98:136-145.
Pavalonis B. (May 2012) Evaluation of EPA Dispersion Modeling Using Passive Monitors. B Pavalonis, OEH PhD Dissertation.

Pavalonis B. (May 2012) Relative exposure to swine confined animal feeding operations and childhood asthma prevalence in an agricultural cohort. OEH PhD Dissertation.

Pavilonis BT, Anthony TR, O'Shaughnessy PT, Humann MJ, Merchant JA, Moore G, Thorne PS, Weisel CP, Sanderson WT (2013) Indoor and outdoor particulate matter and endotoxin concentrations in an intensely agricultural county J Expo Sci Environ Epidemiol. 2013 May-Jun; 23(3):299-305.

Peters TM, Anthony TR, Taylor C, Altmaier R, Anderson K, O'Shaughnessy PT: (2012) Distribution of particle and gas concentrations in swine gestation confined animal feeding operations. Ann Occup Hyg, 56(9), 1080-1090.

Ramirez M, Roth L, Young T, Peek-Asa C. (2013) Rural Roadway Safety Perceptions among Rural Teen Drivers Living In and Outside of Town. J Rural Health. 2013 Winter; 29(1):46-54.

Reeve KA, Peters TM, Anthony TR (2013) Wintertime factors affecting contaminant distribution in a swine farrowing room. *J Occup Env Hygiene* 10:287-296. *[PMID: 23316076]*

Starks SE, Hoppin JA, Kamel F, Lynch CF, Jones MP, Alavanja MC, Sandler DP, Gerr F. (2012): Peripheral nervous system function and organophosphate pesticide use among licensed pesticide applicators in the Agricultural Health Study. Environ Health Perspect, 120(4):515-20.

Starks SE, Gerr F, Kamel F, Lynch CF, Alavanja MC, Sandler DP, Hoppin JA. (2012) High pesticide exposure events and central nervous system function among pesticide applicators in the Agricultural Health Study. Int Arch Occup Environ Health. Jul; 85(5):505-15.

Starks SE, Gerr F, Kamel F, Lynch CF, Jones MP, Alavanja MC, Sandler DP, Hoppin JA. (2012) Neurobehavioral function and organophosphate insecticide use among pesticide applicators in the Agricultural Health Study. Neurotoxicol Teratol. Jan-Feb; 34(1):168-76.

Yang J, O'Gara E, Cheng G, Kelly KM, Ramirez M, Burmeister LF, Merchant JA: (2012) At what age should children engage in agricultural tasks? J Rural Health. 28(4):372-9.

Abstracts/Presentations Accepted for Scientific Meetings

Badtke L, Kelly KM, Wang K, Merchant J, and Ludewig G. (2012): Influence of paraoxonase 1 Q192R and lifestyle factors on PON1 activity over time in an agricultural population. Society of Toxicology Meeting, March 2012, San Francisco, CA.

Burgus S. (2011): Working Farm Youth Education. Midwest Rural Agricultural Safety & Health Conference. November 16-17, 2011, Johnston, IA.

Denning G. (2011): Location, Location, Location: How Data Based on ATV Crash Site Informs Rural Health Policy for Injury Prevention. Midwest Rural Agricultural Safety & Health Conference. November 16-17, 2011, Johnston, IA.

Donham K. (2011): Building capacity in agricultural medicine training. Midwest Rural Agricultural Safety & Health Conference. November 16-17, 2011, Johnston, IA.

Donham K. (2012): Agricultural medicine education, the AgriSafe Network, and the Certified Safe Farm: A U.S. model providing structure and service for occupational health in agriculture.

Fethke N, Gerr F, Merlino L, Branch C, Schall M (2013): A prospective study of musculoskeletal symptoms among agricultural workers. International Society Agricultural Safety and Health 2013 Annual Meeting. June 23-27, 2013, Sandusky, OH.

Fisher, E. (2013): Motivating Families to Create Safe Play Areas on Farms: Intervention Results. International Society Agricultural Safety and Health 2013 Annual Meeting. June 23-27, 2013, Sandusky, OH.

Gerr F. (2012): Neurobehavioral effects of solvent exposure among agricultural works. International Society Agricultural Safety and Health 2012 Annual Meeting. June 24-28, 2012, Burlington, VT.

Harland K, Greenan M, Ramirez M (2013): Increased Risk of Farm Equipment crashes within urban incorporated places during the agricultural off-season. International Society Agricultural Safety and Health 2013 Annual Meeting. June 23-27, 2013, Sandusky, OH.

Harland K, Greenan M, Ramirez M. (2013) Increased risk of farm equipment crashes within urban incorporated places and during the agricultural off-season. 2013 National Meeting of SAVIR, Safe States, and CDC. Baltimore, MD. June 5-7.

Jennissen C. (2011): Safety Tips for ATV Riders: Increasing ATV Safety Knowledge through an In-Classroom Educational Intervention. Midwest Rural Agricultural Safety & Health Conference. November 16-17, 2011, Johnston, IA.

Jennissen C. (2011): Utilizing Social Media to Better Understand the Crash Mechanisms of Actual All-terrain Vehicle (ATV) Crash Victims. Midwest Rural Agricultural Safety & Health Conference. November 16-17, 2011, Johnston, IA.

Jennisen, C (2013): A population-based study of all-terrain vehicle exposure in a rural Iowa county. International Society Agricultural Safety and Health 2013 Annual Meeting. June 23-27, 2013, Sandusky, OH.

Kline A. (2012): Building Capacity of Agricultural Medicine – The Academy of Instructors. Midwest Rural Agricultural Safety & Health Conference. November 16-17, 2011, Johnston, IA.

Madsen M, Donham K (2013): Farm and Ag injuries in press clips. 2013 Upper Midwest Agricultural Safety and Health Annual Forum. April 17, 2013, St. Paul, MN.

Manz N, Silver K, Fethke N, Hoffman K, Loury S, Florence J. (2012): Building a consensus for tomato grower ergonomics: a community-based expert panel study. American Public Health Association 104th Annual Meeting and Exposition. October 27-31, 2012, San Francisco, CA.

Park J, Peters T, Altmaier R, Sawvel R, Anthony TR (2013): Improving Indoor Air Quality in Swine CAFO Using Enhanced Ventilation and Engineering Controls. International Society Agricultural Safety and Health 2013 Annual Meeting. June 23-27, 2013, Sandusky, OH.

Ramirez M, Gerr F. (2012): Agriculture injury surveillance: collaborations between academia and government. Council of Territorial and State Epidemiologists National Meeting. June 3, 2012, Omaha, NE.

Ramirez M., Greenan, M. (2012): Farm Equipment on the Roadway. Midwest Rural Agricultural Safety & Health Conference. November 13-15, 2012, Cedar Rapids, IA.

Ramirez M., Fisher, E., Ellis T, Rautiainen, R, Lee, B. (2012) A Process Evaluation of Safe Play Areas on Farms. Midwest Rural Agricultural Safety & Health Conference. November 13-15, 2012, Cedar Rapids, IA.

Ramirez, M. (2013): Farm lighting policy and frequency of crashes. 2013 National Meeting of the Safe States Alliance and the Society for Advancement of Violence and Injury Research. June 3-7, 2013, Baltimore, MD.

Ramirez, M., Fisher, E., Ellis T, Rautiainen, R, Lee, B. (2013): Motivating families to create safe play areas on farms; a randomized trial. National Meeting of the Safe States Alliance and the Society for Advancement of Violence and Injury Research. June 3-7, 2013, Baltimore, MD.

Reeve KA, Anthony TR. (2012): Wintertime factors affecting contaminant concentration in farrowing barns. Student poster presented at American Industrial Hygiene Conference and Exposition. June 20, 2012, Indianapolis, IN.

Sawvell R, Anthony TR. (2012): Improving indoor air quality in swine CAFOs using enhanced ventilation and engineering controls. Midwest Rural Agricultural Safety & Health Conference. November 13-15, 2012, Cedar Rapids, IA.

Sullivan R, Ramirez, M, Kraemer J, Peek-Asa, C, Gergelt R. (2012): Toxicology testing in fatally injured workers. National Occupational Injury Research Symposium (NOIRS). October 18-20, 2011, Morgantown, WV.

Lectures or Seminars Delivered at the University of Iowa

Anthony TR. (2012): Lectures: delivered to graduate OEH students for 175:230 (n=2 lectures).

Anthony, TR. (2012): Lectures on agricultural health and safety delivered to graduate OEH students for 175:230 (n=6 lectures).

Donham K. (2011-12) Seminar: “Current topics in agricultural safety” delivered to students in 175:210 and 175:210EXW (n=8 class periods).

Donham K. (2011-12) Seminar: Agricultural Safety: Theories & Practice” delivered to students in 175:176 and 175:196EXW (n=4 class periods).

Donham K. (2011-12): Seminar: “Preceptorship in Occupational & Environmental Health” for 175:203 (n=3 class periods).

Donham K. (2011-12): Seminar: “Research in Occupational and Environmental Health” for 175:201 (n=1 class period).

Donham K. (2011-12): Seminar: “Rural Health and Agricultural Medicine” 175:209 (n=42 class periods).

Donham K. (2011-12): Seminar: “Independent Study in OEH” 175:172 (n=3 class periods).

Donham K. (2011-12): “Thesis/Dissertation” 175:300 (n=2 class periods).

Donham K. (2012): Seminar: “Veterinary Public Health: The Profession” 175:211 (n=13 class periods).

Donham, K (2013): Presentation: “Respiratory exposure for pork producers” delivered to 55 undergraduate agriculture students (n=1 class period).

Donham, K (2013): Presentation: “Respiratory exposure for pork producers” delivered to Rural Health Interest Group (22 medical students and faculty) at UI College of Medicine (n=1 class period).

Donham, K (2013): Lecture “Injuries and illnesses in agriculture” delivered to 21 graduate students in course 175:101 (n=1 class period).

Donham, K (2013) Lectures on agricultural safety and health topics delivered to 39 agricultural health professionals in Building Capacity – Agricultural Medicine course. (n=14 lectures)

Fethke N. (2012) Lecture: “Case study of ergonomics in the tomato harvesting industry” delivered to students in a course lecture (n=1 lecture).

Fethke, N (2012): Project presentations in graduate course 175:195 (n=2 lecture).

Fethke, N (2013): Seminar: “Musculoskeletal symptoms among ag workers” delivered to faculty and graduate students in OEH Seminar. (n=1 lecture)

Fethke, N (2013): Lecture “Anthropometry” delivered to 8 graduate students in OEH: 4310. (n=1 lecture)

Gerr F. (2012) Paper review: ‘Musculoskeletal disorders among agricultural workers’ delivered in Course 175:185 (n=1 lecture).

Gerr F. (2012) Lecture: “Neurological effects of pesticide exposure” delivered to 25 Public Health MPH and PhD students (n=1 lecture).

Gerr F. (2012) Paper Review: ‘Asthma and pesticides’ by Hoppin et al.” delivered in Course 175:185 (n=1 review).

Gerr, F (2012): review of agricultural papers, delivered to graduate students in course 175:185. (n=1 lecture)

Gerr, F (2013): Seminar: “Agricultural lung disease” delivered to Occupational Health Residents. (n=1 lecture)

Gerr, F (2013): Lecture: “Musculoskeletal disorders” delivered to group of 39 agricultural health professionals in Building Capacity – Agricultural Medicine course. (n=1 lecture)

Merchant J. (2012) Seminar: “Impacts of industrial livestock production” delivered to OEH students and faculty (1 seminar).

Merchant J. (2012) Seminar: “The children of Keokuk County” delivered to OEH students and faculty (1 seminar).

Merchant J. (2012) Distinguished Faculty Lecture: "Advocating for rural health—Community-based research and policy (1 lecture).

Merchant, J (2012): Seminar: "Farm Animal Protection and Health Policy" delivered to graduate OEH students. (n=1 lecture)

Ramirez M. (2012) Seminar: "Use of KCRHS for data analysis" delivered to MS/PhD students (10 class periods).

Sessions below presented by students in class:

Getchman B, Ramirez M (2012) Occupational Injury Seminar: "Alcohol Abuse and the EFFECTS OF Job Demand on a Population of Rural Women."

Aamodt J, Ramirez M (2012) Occupational Injury Seminar: "Safety training among youth from Keokuk County Rural Health Study who engage in hazardous agricultural tasks."

Smithart K, Ramirez M (2012) Occupational Injury Seminar: "The relationship between intimate partner violence and pregnancy in a rural setting: cross-sectional results from the KCRHS (1994-1998)."

Schwab Reese L, Ramirez M (2012) Occupational Injury Seminar: "PV directionality and risk factors in a rural community."

Wentworth L, Ramirez M (2012) Occupational Injury Seminar: "Self-reported depression and suicide ideation: The Keokuk County Rural Health Study."

Frederick M, Ramirez M (2012) Occupational Injury Seminar: "Intimate partner violence, self-efficacy, and depressive symptoms among adolescents in a rural setting in Iowa."

Afolayan O, Ramirez M (2012) Occupational Injury Seminar: "Injury as a risk factor for depression in a rural community."

Ramirez M. (2012) Lecture: "Farm equipment roadway crashes" delivered to NADS investigators and investigators from Marshfield, Queens University, and University of Alabama (n=1 lecture).

Ramirez, M (2013): Lecture: "GIS in Inquiry ER" delivered to graduate students in Geography. (n=1 lecture)

Ramirez, M (2013): Injury Epidemiology Course delivered to graduate students in Public Health. (n=1 lecture)

Ramirez, M (2013): Lecture: "Safe play on farms" delivered to graduate students in Occupational Epidemiology course. (n=1 lecture)

Workshops, Seminars, Lectures Conducted by GPCAH Personnel in the Agricultural Community

Donham K. (2012) Lecture: "Farm Safety Day" Rural Health Clinic of Greater Johnson CO. Delivered to farm families from Johnson, Iowa, Keokuk, and Washington Counties, Iowa City, IA.

Donham K. (2011) Webinar: Agricultural Musculoskeletal Diseases.

Donham K. (2011) Webinar: Agricultural Hearing Loss and Other Physical Factors.

Donham K. (2011) Webinar: Human Health Hazard of Veterinary Pharmaceuticals.

Donham K. (2011) Webinar: Agricultural Respiratory Conditions.

Donham K. (2012) Webinar: Certified Safe Farm Translation to Practice.

Donham K. (2011) Workshop: Building Capacity. Agricultural Medicine: the Core Course. Marshfield Farm Medicine Center, Marshfield, WI.

Donham K. (2011) Workshop: Agricultural Medicine: the Core Course, Vermont Farm Health Task Force, Burlington, VT.

Donham K. (2011) Workshop: Agricultural Medicine: the Core Course, Lakes Technical College and ND Office of Rural Health, Devils Lake, ND.

Donham K. (2012) Workshop: Agricultural Medicine: the Core Course, Marshfield Farm Medicine Center, Marshfield, WI.

Donham K. (2012) Workshop: Agricultural Medicine: the Core Course, North Carolina Agromedicine Institute, East Carolina University, Greenville, NC.

Donham K. (2012): Lecture: Personal protective equipment demonstration and use, Farm Progress Show, Boone, IA.

Donham K. (2012) Workshop: Agricultural Medicine: the Core Course Central States Center for Agricultural Safety and Health, Omaha, NE.

Donham, K (2013) lectures delivered to 12 Healthcare professionals enrolled in Agricultural Medicine: The Core Course, Greenville, NC. (n=14 lectures)

Donham, K (2013) lectures delivered to 21 Healthcare professionals enrolled in Agricultural Medicine: The Core Course, Middlebury, VT. (n=14 lectures)

Donham, K (2013) Presentation: “Confined space and grain safety” delivered to Agricultural Safety & Health Council of America, Minneapolis, MN.

Donham, K (2013) Presentation: “Iowa's Center for Agricultural Safety and Health” delivered to Public Health, Extension, and Department of Agriculture personnel and farmers, Ames, IA.

Donham, K (2013) Lecture: “Occupational and Community Health Concerns of Large Scale Swine Production” delivered to 150 college students, faculty, and community members at Grinnell College, Grinnell, IA.

Donham, K (2013) Lecture: "Agricultural Health and Safety for agricultural Producers: Swine Production" delivered to 55 students and 2 faculty in the Agriculture 450 course at Iowa State University, Ames, IA. (n=4 lectures)

Donham, K (2013) Presentation: "The Progress and Development of the Rural Health and Safety Clinic of Greater Johnson County", delivered to the Johnson County Board of Health, County Board of Supervisors, Public Health Staff, and Community members.

Donham, K (2013) Webinar: "SW Center for Agricultural Health, Injury Prevention, and Education Update" delivered to the AgriSafe Network.

Donham, K (2013) Webinar: "High Plains Center for Agricultural Health and Safety Update" delivered to the AgriSafe Network.

Donham, K (2013) Webinar: "SE Center for Agricultural Health and Injury Prevention Update" delivered to the AgriSafe Network.

Donham, K (2013) Webinar: "National Children's Center for Rural and Agricultural Health and Safety Update" delivered to the AgriSafe Network.

Gerr, F (2012) Keynote presentation at 2012 Midwest Regional Agricultural Safety and Health Conference, Cedar Rapids, IA.

Merchant J (2012) Rapporteur: UNC and UI CAFO Research Workshop, Chapel Hill, NC

Merchant J (2012) Commissioner and discussant: National Commission on Industrial Farm Animal Production Workshop—Update and Review. Center for a Livable Future, Johns Hopkins Bloomberg School of Public Health, September 30 - October 2, Baltimore, MD.

Peek-Asa, C (2013) Lecture: "Rural Driving Interventions: from the street to the driver" delivered to Ohio State University College of Medicine Speaker Series attendees.

Ramirez M. (2012) Lecture: "Fatality Assessment and Case Evaluation: Toxicology Testing in Fatally Injured Workers" delivered at the Iowa State Medical Examiners Meeting, Des Moines, IA.

Ramirez, M (2013) Lecture: "Safe Driving Interventions for Rural Teens on Rural Roads" delivered to Nationwide Children's Hospital Lecture Series.

Consultation or Information Exchange with GPCAH Community Partner Organizations

Anthony TR. (2011-12) Consultation: "Barn Air/Ventilation" walk through and discussion (3 producer sites).

Anthony TR. (2012) Information Exchange: Study Results (poster and brochures) provided to intervention site.

Donham K. (2012) Information Exchange: "Library information services, hot line calls, research compendium, research to practice discussion" discussed in a conference call with the RAC of the GPCAH.

Consultation or Information Exchange with Agricultural Organizations and Community Members
Anthony, TR (2012) Information exchange with the Rural Health and Safety Clinic of Greater Johnson County about noise in rural settings.

Anthony, TR (2013) Consultation: Co/CO2 sensors for grain bins, via email with farmer/producer.

Donham K. (2012) Information Exchange: "Designing and developing programming that is relevant to the farm population of the 4 country region of Johnson, Iowa, Washington, and Keokuk Counties" to the Rural Health and Safety Clinic of Greater Johnson County.

Donham, K (2013) Consultation: ASH Curriculum Development Textbook Series development with North Carolina Agrimedicine Institute.

Donham, K (2013) Consultation: meeting with National Ad Hoc Coordinating Committee on Agricultural Safety and Health.

Donham, K (2013) Consultation: Agricultural Medicine Core Course – Vermont site.

Donham, K (2013) Consultation: Simple Solutions for Farm Safety with the Iowa State University Design Center.

Donham, K (2013) Consultation: Development of Agricultural Safety and Health Curriculum to certify members of ISASH with ISASH members and leaders.

Donham, K (2013) Consultation: MRSA in swine with Grinnell students.

Donham, K (2013) Consultation: Issue of CAFO moving into neighborhood with Davenport residents.

Donham, K (2013) Consultation: Writing a certified safe program with Brazilian food producing company.

Donham, K (2013) Consultation: Fatality in a swine firm with Virginia swine producing firm.

Donham, K (2013) Consultation: Worker fatality in pork processing plant with law firm in NC.

Fethke, N (2013) Consultation: "Best practices" for exposure assessment in research about ergonomics in agriculture with academics from a variety of institutions in the US and Canada.

Fethke N. (2012) Consultation: Ongoing consultation on project within the Colorado State Agricultural Center.

Fethke, N (2013) Consultation: potential collaborations with the director of Environmental & Occupational Health for the Migrant Clinicians Network.

Fethke, N (2012) Consultation: "Employees reporting musculoskeletal symptoms", via email, farm owner utilizing "Ask an expert" service on GPCAH website.

Gerr, F (2012) Member, Building Capacity Curriculum Revision Committee, 2012 Midwest Regional Agricultural Safety and Health Conference, Cedar Rapids, Iowa.

Gerr, F (2013) Consultation: Proposal preparation/research methods with director of the Rural Health Clinic of Greater Johnson County.

Gerr, F (2013) Consultation: Proposal preparation/research methods with personnel from Farm Safety for Just Kids.

Nonnenmann, M (2013) Consultation: Grain bin safety resources with a Washington County Public Health nurse.

Peek-Asa, C (2013) Technical Assistance: Rural road safety and rural bus crashes, with Iowa Department of Transportation.

Peek-Asa, C (2013) Consultation: Advocacy & Testimony for Graduated Driver's Licensure.

Ramirez, M (2013) Consultation: with DOT partners about meeting at Ag Summit to share results and get feedback on issues.

Ramirez, M (2013) Information sharing: Rural Road Safety and Crash Data for Dubuque County Iowa with Dubuque County Health Department and IBM.

Ramirez, M (2013) Consultation: Safe Play on Farms (in collaboration with Marshfield Clinic and CS-CASH) with American Family Insurance.

Information Provided to Policy Makers

Anthony, TR (2013) Swine Barn Explosion information provided to NIOSH/OSHA Liaison at information exchange meeting at request of Brad Husberg, Director NIOSH Office of Agriculture, Forestry, and Fishing.

Donham K. (2012) Child Labor Law information provided to Senator Harkin's Staff.

Donham (2013) Rural Health/Agricultural Safety & Health information provided at the Legislative Breakfast -- Iowa Legislation with Center for Rural Health.

Donham, K (2013) Proposed Legislation for Roadway Use for ATVs provided to ICASH Board and Advisory Committee.

Donham, K (2013) Grain Safety & Primary Care, a white paper review with the National Grain Safety Coalition.

Gerr F. (2012): Impact of the Great Plains Center for Agricultural Health provided to the AFF Review Panel of the National Academy of Sciences, May 31.

Gerr, F (2012): National Academies of Science. Re-review of NIOSH Agricultural Forestry and Fishing Program. Washington, DC.

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Policy Reports and White Papers

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Press Releases and Media Stories

Anthony TR. (2012): "Safety Tips for Agricultural Workers: Lessons Learned through Fatality Investigations," *Farm Families Alive and Well* newsletter (18):2.

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